



PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 9669WO/AT		FOR FURTHER ACTION		See Form PCT/PEA/416
International application No. PCT/EP2005051218		International filing date (day/month/year) 16.03.2005	Priority date (day/month/year) 16.03.2004	
International Patent Classification (IPC) or national classification and IPC INV. B25J9/16				
Applicant ABB AB et al.				
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 38.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau a total of 2 sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 807 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>				
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input checked="" type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p>				
Date of submission of the demand 04.10.2005		Date of completion of this report 04.07.2006		
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized officer Lumineau, S Telephone No. +49 89 2399-2959 		

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

IAP12 Rec'd PCT/PTO 18 SEP 2006

International application No.

PCT/EP2003/01218

107593272

Box No. I Basis of the report

1. With regard to the language, this report is based on

- ☒ the international application in the language in which it was filed
- ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of:
 - ☐ international search (under Rules 12.3(a) and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4(a))
 - ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the elements* of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1-15 as originally filed

Claims, Numbers

1-4 received on 30.01.2006 with letter of 26.01.2006

Drawings, Sheets

1/5-5/5 as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/EP2005/051218

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-4
	No: Claims	
Inventive step (IS)	Yes: Claims	1-4
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-4
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following document:

D1: EP 0521440 A (Kabushiki Kaisha Daihen) - 7 January 1993

In their present state, the independent claims 1 and 3 of the application lack clarity, as explained in Item VIII below. The following statement is therefore made on the basis of an interpretation of these claims and their future patentability (eg when entering the European regional phase) is subject to necessary clarifications.

2. **Independent claim 3: novelty**

The document D1 is regarded as being the closest prior art to the subject-matter of claim 3.

The subject-matter of claim 1 differs from the method known in D1 in that it comprises the following steps:

- (i) selecting one of the manipulators as a leading manipulator;
- (ii) creating a memory list including all manipulators that are to be moved synchronously with the leading manipulator.

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

3. **Independent claim 3: inventive step**

The features (i) and (ii) above allow to control a system comprising **several** manipulators having to be moved synchronously with a leading manipulator. Moreover, it is possible to **switch** the leading manipulator. This can for example be useful if the user wants to always select as leading manipulator the manipulator

which in the best position in his/her field of view.

The system described in D1 is restricted to two industrial robots, the first one carrying a workpiece and the second one having a tool. The leading robot is predetermined and cannot be changed. Therefore, it would not be obvious for the skilled person to modify the system disclosed in D1 so as to arrive at a system according to claim 3.

The subject-matter of claim 3 consequently involves an inventive step.

4. Independent claim 1: novelty and inventive step

Claim 1 has been considered as having the same scope as claim 3 (see Item VIII below). Its subject-matter therefore also meets the requirements of Article 33(1) PCT concerning novelty and inventive step.

5. Dependent claims

Claim 2, respectively claim 4, is dependent on claim 1, respectively on claim 3, and as such also meets the requirements of the PCT with respect to novelty and inventive step.

6. Industrial applicability

The claims 1 to 4 satisfy the criteria of industrial applicability as defined for the purposes of the international preliminary examination in Article 33(4) PCT.

Re Item VII

Certain defects in the international application

Figure 5/5 only contains text matter, contrary to the requirements of Rule 11.11(a) PCT. As this text is also a part of the description (see page 13), figure 5/5 should merely be

suppressed.

Re Item VIII

Certain observations on the international application (clarity)

The application does not meet the requirements of Article 6 PCT. The reasons for this objection are the following:

1. Although claim 1 has been drafted as a product claim, its characterizing portion only contains method steps. It is not clear which technical means (i.e. which parts of the system) allow to perform these steps. Moreover, no example of such means is given in the description, which only mentions method steps. It seems therefore not possible to obtain a clear product claim and claim 1 has been considered as having exactly the same scope as the method claim 3.
2. In claim 3, reference is made to the relative positions of the second coordinate systems. It is however not clear how these relative positions are originally determined. It appears therefore essential to mention explicitly in claim 3 that these relative positions have to be defined before starting the command of the robot. The following step should therefore be added in claim 3 after the step "creating a memory list [...]":

placing the manipulators in a work position so as to define the position of the second coordinate systems of the manipulators that are to be moved relative to the second coordinate system of the leading manipulator;

A support for this feature can be found in the description, see page 11, lines 28 to 30.

CLAIMS

1. A system including at least two manipulators (1,2,3), namely robots (1,2) and/or external axes (3), each manipulator controlled by a control system and programmed to carry out a plurality of tasks, the system comprising a handheld control tool for manually manipulating the manipulators, said hand held control tool comprising communication means communicating with the control system characterized in that each manipulator is movably oriented in a first coordinate system (4), and a second coordinate system (5, 6, 55) is defined for each manipulator so that one part of said manipulator stands still in the second coordinate system, and that each second coordinate system is movable relative to the first coordinate system, the system is adapted to:
- select one of said manipulators as a leading manipulator,
 - create a memory list including all manipulators that are to be moved synchronously with the leading manipulator,
 - receive a movement command from the hand held control tool,
 - create a move order for the leading manipulator, based on the received movement command and the current position of the leading manipulator, and
 - create move orders for the remaining manipulators in the memory list, such that said parts of the manipulators, which stand still in the second coordinate systems, are moved such that they keep their relative positions relative to the second coordinate system of the leading manipulator.
2. A system according to any of the preceding claims, characterized in that said hand held control tool comprises a manipulator input means in a form of a joystick.
3. A method for controlling a system of manipulators including at least two manipulators (1, 2, 3), namely robots (1,2) and/or external axes (3), each manipulator controlled by a control system and programmed to carry out a plurality of tasks, wherein each manipulator is movably oriented in a first coordinate system (4), the system comprising a handheld control tool for manually manipulating the manipulators, said hand held control tool

comprising communication means communicating with the control system characterized in that the method comprises:

- defining a second coordinate system (5, 6, 55) for each manipulator so that one part of said manipulator stands still in the second coordinate system, and that each second coordinate system is movable relative to the first coordinate system,
 - selecting one of said manipulators as a leading manipulator,
 - creating a memory list including all manipulators that are to be moved synchronously with the leading manipulator,
 - receiving a movement command from the hand held control tool,
 - creating a move order for the leading manipulator, based on the received movement command and the current position of the leading manipulator, and
 - creating move orders for the remaining manipulators in the memory list, such that said parts of the manipulators, which stand still in the second coordinate systems, are moved such that they keep their relative positions relative to the second coordinate system of the leading manipulator.
4. A method according to claim 3, wherein said hand held control tool comprises a manipulator input means in a form of a joystick creating a movement command by using the joystick.